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Sava River Basin Prioritization and Refinement of Action Plan Projects

Sava Countries
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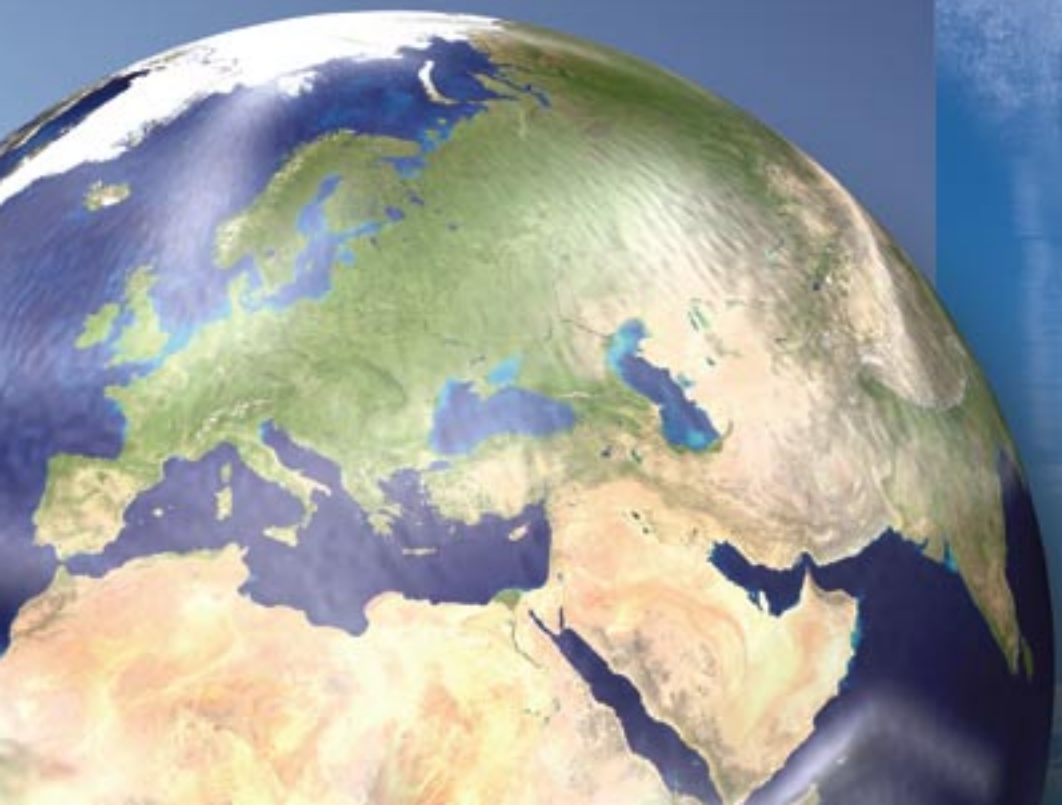

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Redrafting the Sava River Basin Action Plan: Prioritization and Refinement of Projects

Results of the Action Plan Review Team Visits to Bosnia-Herzegovina, Serbia-Montenegro, and Croatia, September 15-24, 2003

Prepared for the 4th Meeting of the Interim Commission for the Sava River Basin

December 15-17, 2003

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1. INTRODUCTION

During the 8 – 11 July 2003 meeting of the (Interim) International Committee for the Sava River Basin, it was agreed that a mission to the Sava Countries would be jointly organized and executed by the consultants of the Netherlands Project and the consultants of the US project. The objective of the mission was to more fully assess, together with the appointed country experts, the needs of the Sava Basin Countries and to discuss the project fiches provided in the Interim Action Plan (IAP) for the Sava River Basin in order to create a good basis for the redrafting of the current draft plan.

More specifically, the consultants were requested to: 1) sharpen the focus of the infrastructure investment portfolio in the IAP by helping the country representatives to bring the current project fiches into a reasonably uniform state of consistency and completeness appropriate to their intended purpose, 2) establish an initial prioritization concept for projects to meet the most urgent needs of the Sava Countries within the context of the International Framework Agreement (IFA) for the Sava River Basin; and 3) collect information needed to develop a *regional* implementation and investment strategy that identifies the measures needed to adequately prepare projects for financing and investment by taking full advantage of the process of cooperation established by the IFA, and that identifies the Sava Commission's role in this strategy.

To meet these objectives, meetings were held with experts from three Sava countries, as designated by each country's representative to the Interim Commission for the Sava Basin. Although it was the intention also to visit Slovenia, this was logistically practically impossible given the limited period of the planned mission. It was therefore agreed with the representative of Slovenia, Mr. Mitja Bricelj, to communicate by phone/email, if needed in this stage of the work. The mission schedule was as follows:

Sarajevo, BiH: September 15
Banja Luka, BiH: September 16
Belgrade, S-M: September 18-19
Zagreb, BiH: September 22-23

Mssrs. Teun Botterweg of ECORYS, John Butler of Booz Allen Hamilton, and Ms. Karyn Posner-Muller, Regional Environment, Science and Technology Attaché of the U.S. Embassy in Budapest, Hungary participated in all meetings. Mr. Arturo Riojas of Booz Allen Hamilton participated in the meetings in Sarajevo, Banja Luka, and Belgrade; and Mr. Anatoly Hochstein of Louis Berger International participated in the meetings in Zagreb and Brcko. In addition, Mssrs. Butler and Hochstein participated in a meeting of the Sava Basin Technical Steering Committee on Navigation, held in Brcko, BiH, on September 24, convened to review the status of Project Number 1 of the IAP (Reconstruction of Navigation and Rehabilitation of Waterway to the Level of 1990).

The following section provides a summary of mission findings for each project in the IAP. General conclusions drawn from reviews of individual projects are provided in the last section of this report.

2. FINDINGS REGARDING INDIVIDUAL PROJECTS IN THE INTERIM ACTION PLAN

2.1. Projects in Bosnia and Herzegovina (BiH)

The IAP includes projects in Bosnia and Herzegovina as well as the seven projects common to the Sava countries (i.e., six integrated water management projects and one regional project to reopen the Sava for navigation). A summary of information regarding these projects discussed during the meetings is provided below, categorized by project type:

- Flood Control Projects
- Integrated Water Management Projects
- Ports Projects
- Other Projects

2.1.1. Flood Protection Projects

Discussion:

The IAP includes nine flood control projects in BiH:

- Three projects are in the Federation of Bosnia and Herzegovina (Projects 21, 22, and 24). All three are concentrated in the area of Samac and involve rehabilitation of the system of dikes, canals, and pumping stations for diverting the waters of the Sava during flooding stages to protect local municipalities.

- Five projects are in the Republic of Srpska (Projects 17, 18, 19, 20, and 23). In general, these projects are essentially the same as projects in the Federation (i.e., rehabilitation of the systems of dikes, canals, and pumping stations for water diversion). The locations of the projects extend across a wider area than those in the Federation.

- One project, in the Republic of Srpska (Project 15) is focused on flood protection for the rest of RS outside of the areas covered by the five locality-specific projects. This project consists primarily of rehabilitation of the embankment for 204 kilometers in RS, along with rehabilitation of pumping stations.

During the meetings in Sarajevo and Banja Luka these projects were described fairly briefly, without going into extensive detail, due to their similarity. Several important factors are common to all of the projects and are discussed below.

Flood Control Rehabilitation Projects in the Federation of BiH (Projects 21, 22, and 24) and in the Republic of Srpska (Projects 15, 17, 18, 19, 20, and 23):

These projects were all designed and built to divert waters from localities during periods of high water stages. The Federation projects are all located in the Samac area near the Sava River. The RS projects are more geographically dispersed along the Sava. Each project can be succinctly described as a local system of canals, diversion structures, and pumping stations to divert surface

water from localities near the Sava River. Each of the flood control systems is managed by a local water authority. Their mandate is solely to control flooding; irrigation and water supply are not within their scope of responsibilities. The review team did not receive any information regarding the sizes and budgets of these authorities.

The bases for cost estimates of all of the projects were provided in studies conducted in the late 1990s by local consulting organizations, referenced in the IAP project fiches, and were incorporated in a recent World Bank study that included a review of the projects. A substantial amount of information is available for each project, identifying specific measures needed to rehabilitate each local system. This includes replacement of pumps, repair of diversion systems and canals, and rehabilitation of embankments.

The systems have been largely in a state of disrepair since the early 1990s. There is no way to assess the vulnerabilities posed to localities dependent on these systems for flood protection since no major flood events have occurred since that time; however, several participants in the meetings expressed concerns over risks posed to the localities due to the poor conditions of the systems.

A precondition for initiation of the projects is demining, requiring an estimated total of 3.2 million KM. These costs are not reflected in the project fiches. Requests for demining in the Samac area are pending with the BiH demining agency.

Conclusions:

The project fiches in the IAP do not adequately present the projects in a way that makes them clear to potential donors, and they need to be substantially revised to do so. They could be improved by including more information that is currently in the possession of the project proponents, as presented during the Sarajevo and Banja Luka meetings, including: maps showing project locations; sketches of the individual systems; listings of specific repairs/equipment replacement requirements and costs; current conditions of the systems; and descriptions of systems operations and management. Also needed are descriptions of the local water authorities that are responsible for managing and operating the systems, including organization and responsibilities, number of staff, and annual budget. Further, a description of damages that have occurred in each of the project areas in the past in terms of human tolls and economic costs, and an analysis of the risks posed by state of disrepair of the systems are highly recommended.

Beyond these measures for individual projects, the Federation and RS should consider "bundling" these projects for the purpose of obtaining financing. This would provide a practical means for conveying to potential donors and investors a regional picture of the cost and benefits of flood control in BiH, and a strategy for flood control in the context of the IFA framework. In this regard, development of a basin-wide flood control plan (IAP Project 6) and warning system (IAP Project 8), and linking of the projects to these basin-level projects would enhance the likelihood of international assistance.

2.1.2. Integrated Water Management Projects

Discussion:

Regarding Project 6 (Revision and Improvement of Existing Flood Control Systems), BiH representatives informed participants in the Sarajevo meeting that the flood working group for the Sava Basin had agreed to prepare Terms of Reference (TOR) for a basin flood control plan. This relates to the work of the ICPDR expert group for flood protection, where BiH plays a co-coordinating role.

Regarding Project 9 (Improvement of the Monitoring System for Water Quantity and Quality Parameters), the monitoring network in place prior to the war was completely destroyed. Some stations have been reestablished (35 monitoring stations in the Federation; a somewhat larger network in RS), but the network is very deficient as a source of information for development and execution of a river basin management program. Further, the monitoring system in BiH is not harmonized with those in the other Sava countries.

Regarding Project 8 (Establishment of Joint Warning System for Flood Control and Accidental Pollution), it was mentioned that BiH is not yet linked to the ICPDR system of PIACs (Principal Information and Alarm Centres).

Conclusions:

The comments regarding Projects 6, 8 and 9 underscore the importance of presenting a coordinated approach to integrated water management in the Action Plan that truly represents a consensus of the Sava countries and an accurate picture of the current situation. For example, the Terms of Reference for a basin flood control plan should represent a consensus of the four countries on the elements of the plan in light of the countries' current flood control programs and policies. Therefore, the project fiche for the flood control plan should correspond to the TOR, and the Action Plan should describe the consensus-building approach used by the countries in designing the flood control plan. Likewise, the discussion of Project 9 should describe the state of monitoring in each country and provide a management framework for assuring that improvements of the monitoring network in each country will be harmonized in accordance with the IFA framework.

2.1.3. Ports Projects

Discussion:

At the Banja Luka meeting, Project 1 (Reopening Navigation) was identified as first priority since its completion is a precondition to the ports projects in the IAP. The two BiH ports, Brcko and Samac, were identified as very high priority.

Regarding the Port of Brcko (Project 3), the source of cost estimates provided in the IAP project fiche is the Master Plan for Transport in B&H, prepared in 2001 through funding from the Japanese International Cooperation Agency (JICA). The project fiche does not reflect recent rehabilitation activities at the port, or more recent analyses of the port conducted by OHR. This information indicates that capital investments may be lower and may be phased in, with private investment, to reduce the need for international donor assistance.

The Port of Samac (Project 4) has not been rehabilitated and is in substantial need of investment before its potential can be realized. As with Brcko, the cost estimates in the Samac project fiche were derived from the 2001 JICA study and need to be updated. At the present time, Brcko is more attractive to investors since it can be brought into full commercial operation in a shorter time at substantially lower costs. However, over the longer term Samac may be an important center for transportation, particularly given its strategic location in the Pan European Transport Corridor VII.

Conclusions:

The project fiches for both of these projects need to be updated to reflect the current costs and transport conditions, as well as the current conditions of the ports. For the Brcko port, more detailed discussions with OHR are needed to ensure that information in the Sava Action Plan accurately reflects recent OHR studies and investments in the port. Further, recent ownership and management changes at the port need to be reflected in the project description.

The lack of any information or analysis of likely traffic at the ports is a serious hindrance to obtaining financing. Investors and donors require reasonable projections of economic benefits to be realized from transport projects in order to evaluate their cost/benefit potential. While the JICA study provides a useful starting point for such projections, an updated analysis of regional transport needs, based on the current economic situation in the region and reasonable assumptions reflecting country economic development strategies, is critically needed to demonstrate the economic viability of the proposed port rehabilitation projects.

2.1.4. Other Projects

Hydropower: Project 26 (Hydropower Plant Vrholje)

Discussion:

This project focuses on power generation, flood protection, and irrigation. It is a "greenfields" project, located on the Gomjenica River in western BiH. The plant would have an installed capacity of 60 megawatts. While a prefeasibility study has been conducted (in the nature of a scoping study), detailed engineering studies and an evaluation of the financial feasibility of the project have not been prepared. Therefore, critical information needed to support financing of the project, including projected electricity demand, cost of generation, and condition of the regional grid, is not available.

Conclusions:

Meeting participants acknowledged that the project needs much greater definition and elaboration, and that its cost and benefits need to be quantified and evaluated. Questions were also raised about whether this project can be considered "regional" for purposes of inclusion in the Sava Basin Action Plan, since it would largely serve the needs of local communities.

In summary, the project fiche needs to be rewritten to define the project with clarity and to clearly articulate international assistance that is needed. The project needs substantial preparation before it can be considered to be ready for financing, and probably the most needed

assistance is preparation of a feasibility study that identifies and evaluates alternatives for hydropower production, flood control, and water supply in the region in light of technical, financial, and institutional constraints.

This project also highlights the need for the Sava countries to reevaluate the kinds of projects appropriate for inclusion in the Sava Basin Action Plan. The question of whether this project is of regional importance underscores the fact that there is not a common understanding among the Sava countries over criteria for selecting projects to be included in the action plan.

Further, the nature of this project, focused primarily on hydropower development, raises a number of questions over how it should be addressed in the Action Plan and what role the Sava Commission should play in the project. For example, if the only purpose of the project is power production, then the Commission's role might be solely one of oversight to ensure that the project is designed and executed to ensure that the IFA's sustainable water management objectives are not compromised. In this respect, the project would be considered as a "stressor" to integrated water management. However, if it can provide a substantial contribution to flood control in the Sava basin, then the project might be presented as a component of the Sava flood control plan that directly supports the hazard prevention objective articulated in Article 2 of the IFA.

2.2. PROJECTS IN SERBIA-MONTENEGRO (S-M):

During the meetings in Belgrade, S-M projects in the IAP and the seven regional projects in the plan (Project 1; Projects 6-11) were discussed. In addition, four new projects for potential addition to the action plan were discussed. The projects included actions related to

- Flood control
- Ports
- Regional Navigation
- Integrated Water Management
- Others

2.2.1. Flood Control Projects

Discussion:

The three flood control projects in S-M (Projects 12, 13, and 14) all entail rehabilitation of embankments along the right bank of the Drina and Sava Rivers, to provide flood protection of the Macva region. The Macva area is in the lowlands of the Sava basin, and is particularly vulnerable to floods. According to the Institute of Development of Water Resources, overflow or failure of the levees anywhere on the 70-km line of defense would result in flooding of a surface area of about 30,000 hectares, inundating several thousand housing units in 14 towns in the region.

As a result of flooding at the confluence of the Drina and Sava in 1974 that resulted in overflow of the embankments in place at the time, a regional plan was prepared calling for reinforcing and raising the heights of embankments on both sides of Sava to ensure protection against 100-year floods. While reconstruction was carried out on the left bank and along sections of the left bank

during the 1980's, the works were not completed on the right bank. Further, the reconstruction did not provide a consistent level of protection against a 100-year flood event.

Representatives of the Institute for Development of Water Resources provided details of the three embankment rehabilitation projects to the mission team. The plans call for reconstruction of the three sections of the existing levees, using conventional construction techniques and materials (clay overlaying sand). Overall, the design and cost estimates as reflected in the project fiches in the IAP appear to be reasonable and straightforward. However since the engineering design is based on analysis conducted in 1989-90, an updated study is recommended to review and refine the designs and cost estimates to reflect the current conditions of the embankments and to update cost estimates using current construction practices can cost assumptions.

Representatives also cited the critical need for the development and execution of agreements and institutional measures to assure communication and coordination across the Sava countries for effective control of the water regime during high flow conditions, including coordinated management of retention areas and reservoirs. Inadequate and poorly coordinated management of upstream conditions (e.g., from retention basin management in the Central Sava Region, existing and planned reservoirs in the Drina, and other upstream activities) could result in the coincidence of particularly forceful flood waves in Serbia-Montenegro.

Conclusions:

Projects 12, 13, and 14 appear to be based on sound planning and to reflect national priorities. Bundling of these projects into one project for protection of the Macva region, with a schedule for phasing in rehabilitation of the levees, might make it more attractive from a donor perspective. Cost estimates should include additional provision for updating the existing engineering design study. Also, elaboration of the damage caused by past flooding in the region should be included in the financing application. Finally, as with the other flood control projects in the IAP, the likelihood of financing of these projects would be greatly enhanced if a discussion of the process for cooperation among the Sava countries (i.e., discussion of the regional flood control plan (IAP Project 6) and joint warning system (IAP Project 8) was provided in the application.

2.2.2. Port of Belgrade

Discussion:

Project 2 (Improvement of Existing Facilities at the Port of Belgrade) is included in the IAP. While this project is a regional priority, it was not discussed during the mission visit. Rather, the importance of reopening the Sava to navigation (IAP Project 1) was emphasized.

2.2.3. Reopening of Navigation

Discussion:

The mission team was informed during the Belgrade meetings that the Government of Serbia-Montenegro has committed expenditures of one million US Dollars equivalent to clear debris in the Sava in the areas of the damaged bridges in Ostruznica, to be completed by the end of this

year. Further, a study of unexploded ordnance in the river has been completed and the rivers banks have been cleared of mines and unexploded ordnance. All funding for work in the Sava has been provided by the Government, with no financial assistance provided from other sources to date.

However, work needed to reopen navigation in S-M section of the Sava is still incomplete. A bathymetric survey has not been conducted in this section of the river. While a complete survey may not be needed, a survey of shallower sections and areas near the damaged bridges is required. This will require about 3-6 months to complete. Also, demining in the riverbed is incomplete. Finally, although there is currently limited navigation in the river, traffic is greatly inhibited due to the lack of marking in the navigation channel.

Conclusions:

With the clearing of bridge debris completed by the end of this year, two tasks remain in the S-M section before dredging and marking can be undertaken: a bathymetric survey, and location and clearing of any remaining unexploded ordnance in the riverbed. These could be completed in a matter of months, and with a minimal amount of funding (under 1 million Euro). An additional discussion of IAP Project 1 is provided in Section 2.4 of this report.

2.2.4. Integrated Water Management Projects

Discussion:

The six regional integrated water management projects were reviewed (Projects 6-11):

Project 6 (Revision and Improvement of the Existing Flood Control Systems) has not yet been funded. In addition to funding, the project requires execution of a number of measures for successful execution, including adoption of protocol called for in the IFA, development of a regional plan, and official support from the Sava countries. In this regard, support from the Dutch project (such as a regional workshop) is very important.

Project 11 (Implementation of WFD-Testing Guidance) has been funded by the CARDS program. The project is interrelated with Project 7 (Development of Strategy for river Basin Management Plan for the Sava River Basin), although Project 11 deals with all aspects of the Water Framework Directive.

Project 9 (Improvement of the Monitoring System for Water Quantity and Quality) is hampered by inadequate funding for a regional system, particularly for S-M and BiH. This issue is exacerbated by the review teams' concerns that the amount of funding cited in the IAP project fiche (1 million Euros) might not be adequate for a regional system, particularly if project needs include procurement of hardware and software. It was suggested during the Belgrade meeting that it would be very useful to formulate an over-all basin-wide technical assistance project in order to better formulate the total range of Projects 6 – 11. This would require extensive inputs from the relevant ICPDR expert groups. In these expert groups all knowledge is available to assist in identifying hardware, software and training needs (both technical and institutional).

Conclusions:

Projects 6-11 were designed as a package of measures that if fully executed would provide a framework for the execution of a basin-wide plan for sustainable development of the Sava Basin. However, since most of these projects have been only partially funded or, in some cases, have not been funded at all, an integrated approach as foreseen by these projects is hampered. This is in spite of the fact that the total funding requirements for the package are relatively small (app. eight million Euros) compared to the benefits.

While lack of funding is an issue, the Sava countries need to do more to facilitate international assistance. One need is to accelerate the pace at which the countries are developing a common set of standards and systems for these regional projects. For example, during deliberations of the Sava Basin Rehabilitation and Development Working Group in 2002, a number of initiatives were launched to improve information sharing among the Sava countries regarding their current systems and programs. Among other things, this included sharing information on systems and formats for managing water quality data and for flood warning systems. These initiatives need to be accelerated and detailed project proposals should be developed, reflecting integrated plans that make efficient use of country resources and systems.

2.2.5. Other Projects

During the Belgrade meetings several new projects were introduced as potential candidates for the Sava Action Plan. These are discussed below.

Rehabilitation of Fish Farm at Confluence of Sava and Drina Rivers

Discussion:

This project appears to be a good candidate for private sector investment, although at present the fish farm is a public enterprise. The project is seen as an effort to guarantee food production in the region. In this regard it was suggested during the meeting that project financing might be most effectively obtained through public/private partnership, with the public sector playing a major role in creating conditions that prevent exacerbation of the sedimentation problems that apparently hamper efficient fish breeding at the site.

Conclusions:

While this project is an important enterprise from a national perspective, its status as a regional project within the context of the Sava IFA is unclear. Therefore, it is not clear that it should be included in the Sava Action Plan.

However, this project illustrates an important relationship between the IFA and economic development in the Sava countries. By establishing the preconditions for regional economic development, such as a framework for integrated water management of the Sava basin and a regional flood control plan as called for in the IAP, the prospects for investment in and financing of economic development projects that are dependent on water resources of the basin are enhanced.

Drina River Basin Integrated Water Resource Management

Discussion:

The Jaroslav Cerni Institute for the Development of Water Resources presented the review team with a project proposal for developing a system for the collection and management of data required for integrated water resource management. This plan is provided in Annex B. It focuses specifically on data required for integration of water information required for decision making in infrastructure projects in the Drina, including hydropower and flood control In regard to hydropower, the Drina has the largest underutilized hydropower potential in the area.

Conclusions:

The review team did not evaluate the project proposal, since the project was not included in the IAP. Further, cost estimates were not provided with the proposal. The proposal highlights the important role of the Sava Commission as a data and project integrator for project planning at a basin-wide level. The Commission can play a central role in assuring that information systems to manage data at the sub-Sava basin level are coordinated and harmonized to assure maximum utilization of the data for basin-wide planning and decision-making. The project proposal should be considered for inclusion in the Sava Basin Action Plan, provided that the project is presented as a component of basin-wide system.

Regional System for Water Supply in the Srem Region

Discussion:

Irrigation in the Srem region has been developed for only about 4 percent of the arable land, with the existing system consisting of a network of about 5,000 km of canals. This project would ultimately provide irrigation for about 89 percent of arable land. The total investment needed for the construction of the entire system would take place in about 30 phases executed over a period of 50 years. The total investment costs including interest would be about 786 million Euros. About 85 percent of water intake would be from the Sava and Danube Rivers (app. 60/40 percent).

Conclusions:

The review team did not evaluate the project proposal, since the project was not included in the IAP. Although the project is of importance to S-M, it does not appear to be a regional project within the context of the IFA. Nevertheless, the large water withdrawals from and discharges to the Sava would be likely to significantly affect the hydrology and water quality of the river basin. The Sava Commission could play an important role in assuring that the project is carried out in a coordinated way within the framework of the Integrated River Management Plan for the Sava River Basin, one of the key responsibilities of the Commission under the IFA. Such assurance would greatly enhance the attractiveness of the project for potential financing by the international community.

Zasavica River Special Natural (Wetland) Preserve

Discussion:

This region, situated in the northern part of the Macva plain east of the Drina and south of the Sava, was proclaimed as a special natural reservation in 1997. The area extends over 1800 ha, of which 670 ha is protected. Seventy percent of the area is government property. Preservation and reestablishment of the original flora and fauna is foreseen. Six variant solutions where designed and put through a multi-criteria analysis favoring an alternative called Variant 5, with an estimated investment cost of approximately 1 million Euros. Despite the clear documentation, the project description for Variant 5 is unclear about the effects on flora and fauna and about effects of the designed water management system on water quality and hydrology.

Conclusions:

The regional importance of the project for nature conservation should be clarified in terms of the foreseen benefits for flora and fauna, related to the regional effects on water management of its implementation.

2.3. PROJECTS IN CROATIA

Projects discussed in the Zagreb meetings included:

- Upgrade of Central Sava Basin Flood Protection System (Project Number 16)
- Rehabilitation of the Port of Slavonski Brod (Project Number 5)
- Projects in Croatia to reestablish navigation, directly relevant to IAP Project Number 1
- Integrated Water Management Projects (6 regional projects)

2.3.1. Flood Control Projects

Discussion:

The Central Sava Project was the centerpiece of the 1972 Sava Basin flood control scheme. The scheme was developed with assistance of the United Nations Development Program in response to the major floods of 1964 and 1970, which inundated Zagreb, Sisak, and other communities in the basin. The original scheme for flood control of the Sava basin was prepared by a consortium (Polytechna-Hyropojekt-Carlo Lotti & C. Prag-Roma) in cooperation with the UN and representatives of the Yugoslav counterpart in all republics. The 1972 plan is very comprehensive and consists of 21 volumes. In summary, the original project involved construction of large storage areas for excess waters, and conventional dikes, dams and spillways to divert and regulate the flow regime of the Sava. All inundation areas would only be in Republic of Croatia.

Only about 40 percent of the system was completed prior to the outbreak of war in the early 1990's, when construction activities ceased. In 1998 the World Bank funded an environmental impact assessment to evaluate impacts of completion of the system in the Central Sava region,

which provides the most recent baseline for evaluation of the system. Among other conclusions, the EIA identified the works that should receive highest priority as: development of the Lonjsko Polje storage reservoir; protection of settlements on the right bank of Sava between Zagreb and Sisak; and construction of a flood control protection system for Karlovac.

Conclusions:

While completion of the Central Sava Project would accrue substantial benefits to Croatia, as well as BiH and S-M, its large cost (estimated at 130 million Euros if fully completed) is daunting, and raises substantial questions about financing and costs in light of these benefits. During a working session with representatives of the State Water Directives, participants agreed that the following measures would be important in guiding decision makers on the scope and size of the Central Sava Project:

- Better definition of construction and execution phases, in light of the fact that the entire project cannot be financed at one time.
- A risk assessment, economic impact analysis and cost/benefit analyses of project alternatives. In this regard, the risk cost/benefit studies performed during development of the Rhine River Basin flood protection plan might be serve as useful models.
- A comprehensive financing plan that could include provision for all countries benefiting from the project to share in its costs.

2.3.2. Port of Slavonski Brod

Discussion:

The Slavonski Brod Port Authority is completing a Port Development Concept study, providing a vision for a modern regional multimodal transportation facility that would serve a wide range of users. The facility is primarily a "greenfields" project, using the existing port as an entryway but largely consisting of new infrastructure to support the transfer of water, rail, and road cargo. The study significantly updates the profile of the project as provided in the IAP project fiche (Project Number 6). The schedule provided in the study contemplates phased development of the intermodal facility, with 71.1 million Euro estimated cost for engineering and construction during Phase 1 and 171.4 million Euro for engineering and construction during Phase 2, compared to an estimated investment cost of 50.0 million Euro for Phase 1 in the project fiche. The study contemplates that about two-thirds of the investment costs will be borne by private investors; the project fiche indicates that 35 million Euros of international support is needed.

Conclusions:

It is clear that the project fiche in the IAP needs to be completely rewritten to reflect the project design articulated in the Port Development Concept study. In addition to providing the project design, development schedule and budget estimates provided in the study, the project description needs to clearly define the amounts and types of international assistance that are required. The project description should also provide a clear picture of the strategy that project proponents will employ to foster private sector participation in the project; the level of funding to be provided by Croatian government sources; and projected traffic in the port and regional economic benefits to be accrued. Further, it is especially important that the Sava Action Plan identifies the role that

the Sava Commission can and should play in establishing the preconditions for financing, such as reopening the Sava to navigation, and establishing an effective navigation regulatory regime.

2.3.3. Reopening Navigation

Discussion:

The Government of Croatia estimates that about 10.4 million Euros of investments are needed to reopen commercial navigation in the Croatian section of the Sava (1.3 million for feasibility and engineering studies; 9.1 million for execution of the works). When completed, the work would result in upgrading the waterway downstream of Brcko to Category IV, and the section from Brcko to Sisak to Category III. Croatia and BiH have a bilateral agreement calling for each country to finance half of the cost of navigation restoration costs in the section of the Sava that they both share. Croatia spent about 3 million Euros in 2002 and expects to spend about the same amount this year. This has included bathymetric surveys, dredging (about 0.5 million m^3 of the roughly 1.5 million m^3 of dredging has been completed, clearing the bridge at Jasenovac; and marking (all of the waterway on the Croatia side from Slavonski Brod to Sisak has been marked). However, BiH has not provided any funds to date to conduct activities on its side of the waterway.

With the improvements made by Croatia, there is active commercial traffic between Slavonski Brod and Sisak for all but about 60 days per year. Completion of navigation upgrades should enable traffic to operate on a year-round basis.

Conclusions:

Croatia has provided a significant amount of funding for Sava navigation, and as a result the channel between Slavonski Brod and Sisak may be open for year-round transportation in the near future. However, the lack of BiH funds for navigation purposes is a serious obstacle to reopening the Sava downstream of Slavonski Brod, and there does not appear to be a schedule for resolving this problem. The Action Plan needs to be updated to reflect the contribution of Croatia, and to identify with specificity the amounts and types of support from the international community that is needed in light of Croatia's contribution. In this regard, the Sava Commission can play a valuable role in tracking the contributions and progress of the individual Sava countries and assisting the international community in identifying critical obstacles presented by gaps in funding and technical resources.

2.3.4. Integrated Water Management Projects

Discussion:

Croatian officials provided the mission team with an update of the status of the integrated water management projects in the IAP (Projects 6-11):

Project 6 (Revision and Improvement of the Existing Flood Control Systems): Unfortunately, Project 6 appears to be inactive at the present time. However, Slovenia and Croatia are represented on the ICPDR working group that is developing a sustainable flood protection plan for the Danube Basin, with BiH playing a coordinating role and S-M participating. The action

plan is to be conducted in two phases: In Phase 1 (to be completed October 2004) a general picture of the existing flood protection situation in the Danube Basin will be made; while in Phase 2 (to be completed in 2009) a detailed plan of the Danube Basin and its sub-basins will be prepared. The Sava flood protection plan prepared under Project 6 should be harmonized with this plan, and its relationship to the plan should be described in the project fiche.

Project 8 (Establishment of Joint Warning System for Flood Control and Accidental Pollution) also appears to be currently inactive.

Regarding Project 7 (Development Strategy for River Basin Management Plan in the Sava Basin), funding has been secured from the Global Environment Facility for the first phase. This phase involves a data gap analysis among the Sava countries. The gap analysis is expected to be completed in October and a regional workshop will be held to provide the results. Funding has not been secured for the second phase (addressing critical gaps identified in phase 1).

Project 11 (Implementation of WFD – Testing Guidance) has been funded by CARDS. The countries have proposed that the WFD guidance be tested on sub basins in each Sava country; however, the CARDS program has not completely accepted this concept.

Project 9 (Improvement of the Monitoring System for Water Quantity and Quality Parameters) has not been funded. One of the biggest issues facing the Sava countries in the area of monitoring is harmonization of data and monitoring systems. Although Croatia and Slovenia coordinate closely on a bilateral basis as well as under the ICPDR framework, their systems are not harmonized. Further, the monitoring systems of BiH and S-M are not at all comparable. Thus, a plan for harmonization of data collection and management should be a key output of this project.

Conclusions:

Progress in executing the integrated water management projects in the IAP has been slow since the plan was issued in March 2003. This is due in large part to a lack of funding (only Project 11 has been fully funded, and only the first phase of Project 7 has been funded). However, an additional factor appears to be the lack of a organized and coordinated effort by the four Sava countries to take the initial steps in each project that are necessary and that if taken would enhance the prospects for international assistance. These include, for example, information sharing initiatives to evaluate and compare existing systems and procedures across the four Sava countries (e.g., flood management plans; warning systems; and monitoring systems). The results of these initiatives could provide a basis to improve the project definitions and therefore their prospects for funding.

2.4. REGIONAL: REOPENING NAVIGATION

Discussion:

On September 24, 2003, representatives of the Navigation Working Group from BiH, Croatia, and S-M met at the UN Office of the High Representative (OHR) in Brcko, BiH, to review progress of IAP Project 1 (Reconstruction of Navigation and Rehabilitation of Waterway to the Level of 1990). This was the first meeting of the Working Group since February 2003.

In accordance with the goals defined by Working Group and reflected in the project fiche, navigation is planned to be restored to the level of 1990, which is to Class IV from Belgrade to Brcko and to Class III further to Sisak (European classification of waterways). There are also more ambitious plans for further improvements of navigation, beyond the 1990 level, to Class IV throughout the entire navigable waterway from Belgrade to Sisak. Class IV requires the provision of minimum channel dimensions with bend radius 400 m, width 70 m. and depth 2.2 m. guaranteed at water discharge equal or greater than 95% duration. This means accommodation of a pushed tow with two standard European barges and a tug fully loaded for 95% of navigation time, on average.

The nature of river navigation is such that it is possible to navigate even without improvements but only during a shorter period at relatively high water levels. At present, the waterway is utilized on some segments, such as between Slavonski Brod to Sisak and to a very limited extent Belgrade to Brcko. This utilization is, however, limited to about 10 months of the year. Further, due to restricted bends, barges are being tugged instead of being pushed, which further reduces water mode efficiency. Therefore, the focus of navigation restoration is on extension of normal navigation conditions over most of the year providing users with the assurance of normal delivery.

The major methods of waterway improvements are dredging and river training (bank protection, dikes, cut offs of meanders, etc). There are also interrelations between water regulation for flood control and navigation. For instance, creation of reservoirs on upper flows of the Sava River and its tributaries may increase water flows at dry seasons for the benefit of navigation. Obviously de-mining and clearings at the sites of damaged bridges remain prerequisites to the restoration of navigation.

The review of the progress of efforts to restore navigation indicates uneven contributions by participating countries. Croatia is actively involved and has generated considerable progress in both actual river works and investigations. Specifically, Croatia has completed bathymetric surveys of sandbars and is about to produce navigation maps for the entire length of the waterway from Sisak to the border, including the BiH side of the river. Moreover, funds are set aside in Croatia to detail this survey with cross sections 50 meters apart to develop the final design for navigation works. OHR/Brcko District also completed a bathymetric survey from Brcko to 165km. This leaves only 165 km., within the borders of S-M, which still are not surveyed. To date, no funding has been committed to conduct such a survey. In general, activities in BiH and Serbia have been limited to de-mining and clearing debris.

Croatia has also initiated actual traffic between Sisak and Slavonski Brod, to provide transportation services for the oil fields. This traffic is, however, restricted to about a 10-month period of high water. Navigation on this waterway segment is problematic. Water discharge with duration equal or greater than 95% of the time is 135 and 297 cu. meters per sec. at Sisak and Slavonski Brod, respectively. The channel cross sections corresponding to these low discharges are small and dredging might not be effective (since the water level may drop with dredging).

Croatia and BiH have an agreement of commitments of each country in reopening of the waterways channel in the section of the Sava shared by Croatia and BiH. While Croatia has provided funding for the work required on its portion, BiH has not provided funds to date.

Conclusions:

1. Overall, it appears that the level of preparation for restoration of navigation on the Sava River is not beyond the conceptual level, as defined in the existing project fiche. While individual countries, particularly Croatia, have executed portions of the project, little progress has been made at the regional level since the issuing of the Interim Action Plan in March 2003. Funding by individual countries has been very uneven, and there is not a coordinated effort among the countries to prepare the project for financing the major cost items (i.e., dredging and marking).

2. One of the most critical immediate obstacles to project execution is the need to finalize a bathymetric survey in the S-M section of the Sava. Given the depth of the channel in this section, the survey would not necessarily need to be at the same level of resolution as that already completed, and could be completed within a matter of months.

3. The current project fiche does not adequately reflect maintenance costs. Normally, maintenance of navigation conditions on free flowing rivers (without locks and dams) requires efforts and costs not much lower than initial capital work to open a navigable channel. The Sava River is not an exception. The fluctuation of high and low water flow is about 1 to 10 (3,000 and 300 cu. m. per sec at high and low water respectively). During floods existing channels can be silted, necessitating annual maintenance works. An account of maintenance is needed to present more realistic assessment of overall costs associated with restoration of navigation.

4. The Action Plan needs to provide a reasonable picture of the likely traffic to be expected on the Sava. The analysis does not need to be a formal cost benefit analysis but rather an illustration of the waterway's role in the overall regional transportation system. Several factors can be noted in support of this opinion. Restoration of navigation conditions to the 1990 level is a long-term project, providing basic infrastructure and, in addition to low cost transportation, may stimulate the expansion of water related industries. A number of major benefits of river navigation are "external", making them difficult to quantify. These include, for example, the reduction of congestion on land modes, better safety and environment, etc. Due to these benefits, it is a known practice in the European Union to support water transportation, inclusive of direct subsidies, such as the Marco Polo program for environmentally friendly transportation projects. Finally, and notwithstanding maintenance costs, initial investments in restoration of navigation in the Sava River is relatively low, about 20 million euro, including navigation aid but excluding de-mining and the clearing of debris.

At the same time, reference to traffic prior to 1990 is not sufficient to demonstrate the economic validity of the project. The entire regional economic and, accordingly, transportation structure has changed. Restoration of navigation conditions on the Sava River expected to be publicly financed, just like waterway projects elsewhere. Therefore, it is important to illustrate to the public and to potential sponsors the regional significance of the waterway. Much of the related information is currently available in existing reports, addressing markets for the four individual ports on the Sava River.

3. SUMMARY OF FINDINGS AND RECOMMENDATIONS

Information collected during the country visits was very useful in identifying opportunities for improving individual projects in the IAP. In addition to preparing conclusions and recommendations for individual projects, the review team offers the following general findings and recommendations for consideration by the Sava countries in updating the improving the Action Plan.

3.1. General Findings and Recommendations

1. The review team concludes that there is not a consensus among the Sava countries over what constitutes a "regional" project that is appropriate for inclusion in the Action Plan. There is a need for a common understanding of which projects are considered by the countries as being of regional importance as compared to local or national importance, and thus are considered priorities by all the countries. In this regard, some projects can be important to individual countries and localities, and will need to be financed by the countries in which they are located, and at the same time they can provide significant benefits that extend well beyond country borders. For example, properly located and designed ports can serve both local needs and regional needs. Projects in the Action Plan should be thoroughly reviewed by all Sava countries, coordinated by the Sava Commission, to determine whether they individually can be considered of regional priority; whether several projects could be "bundled" to more clearly demonstrated their regional benefits; or whether there are projects that do not represent regional priorities. Projects in this latter category could still benefit from the Sava process of cooperation by being listed in the Action Plan as local projects that are being proposed within the framework of the IFA and with the full support and engagement of the Sava Commission.

2. A related issue is presented by a lack of clarity in the IAP over which projects are essential to fulfillment of the objectives of IFA and the mandate of the Sava Commission, and which projects are enhanced by the IFA but are not essential to its execution. For example, construction of a dam for solely for the purpose of electricity generation does not by itself serve toward fulfilling IFA objectives. Rather, the project would be considered as a "stressor" within the framework of integrated water management. While the Commission could play a valuable role in helping project proponents achieve international support by demonstrating that the project has been designed to ensure that the IFA objective of sustainable water management will not be compromised. In this case, the Sava Commission might not have a direct role in project execution. On the other hand, if the dam is also designed to provide a substantial contribution to flood control in the Sava basin, then the project might be presented as a component of the Sava flood control plan that directly supports the hazard prevention objective of the IFA.

3. The Action Plan tends to present individual projects, but not a clear regional strategy that demonstrates the interrelationships of the projects and the work of the Sava Commission. For example, the plan needs to discuss the relationships between the regional flood control plan required under the IFA and the flood control projects in each country. Regarding ports, the role of the Sava Commission in executing and overseeing a regional navigation regime and the role of the Commission with respect to navigation and port authorities in each country needs to be clearly articulated.

3.2. Flood Control Projects

1. The flood embankment rehabilitation projects in the IAP are based on the existing systems of embankments, which do not provide a significant retention area for floodwaters. This is consistent with the 1972 basin flood control plan. It is probably the lowest cost option in the near term and may be necessary in many locations due to existing towns, residences and other development that has taken place near the river. However, consideration should be given to relocation of embankments in certain locations farther from the riverbanks within the context of a basin-wide flood control plan. This would allow for greater retention of floodwaters with resulting reductions in intensity and levels in the downstream areas of the Sava Basin.

2. A coordinating approach of managing retention areas in the Central Sava Region, flood diversion activities in BiH, and reservoirs in the Drina is crucial to minimizing the impacts of flooding in the Sava Basin. In this regard, the flood control plan and warning system in the IAP (Projects 6 and 8) should be given highest priority. The Sava Commission can and should play a leading role in developing and executing the plan.

3. The design of individual flood control and protection projects should clearly reflect the cumulative effects of all flood control projects in the Sava Basin. In particular, final design of projects based on a 100-year flood event should reflect the flood stage and intensity of the event based on the ameliorating impacts of the Central Sava Project.

4. All project proposals need to address the benefits of the projects as well as their costs. Historical data on flood damages (in terms of economics and human tolls), an evaluation and identification of the most vulnerable areas, and a summary of existing conditions of the flood control structures and systems should be provided.

5. The Action Plan should clearly show the relationships between individual projects in each of the countries and the regional flood control measures and protocols defined in the IFA. In this regard, development of a basin-wide flood control plan (IAP Project 6) and warning system (IAP Project 8), and integration of the projects into these basin-level projects would enhance the likely of international assistance.

3.3. Integrated Water Management Projects

1. Funding of the six regional projects directed to developing a basin-wide approach to sustainable development (Projects 6-11) are hampered by inadequate and uneven funding among the Sava countries. The total amount of funding required (roughly eight million Euros) is relatively small compared to the benefits accrued from this package of projects. This message, i.e., that the benefits of this package of projects far exceeds its costs, does not come through in the IAP.

2. While lack of funding is an issue, the Sava countries can and should to do more to coordinate their efforts in the integrated water management area in order to facilitate international assistance. One need is to accelerate the pace at which the countries are developing a common set of standards and systems for these regional projects. For example, during deliberations of the Sava River Basin Rehabilitation and Development Working Group in 2002, a number of initiatives were launched to improve information sharing among the Sava countries regarding

their current systems and programs. Among other things, this included sharing information on monitoring and information systems, and formats for reporting water quality and other key data. These initiatives need to be accelerated and detailed project proposals developed reflecting integrated plans that make efficient use of country resources and systems. In this regard, the Sava Commission (and Interim Commission) should play a central coordinating role in information-sharing.

3. The Action Plan presents the six components of the Integrated Water Management framework as distinct and almost independent projects. In reality, the individual projects were developed by the Sava countries as components of an overall plan to achieve the IFA objectives of sustainable water management and hazard prevention. The plan needs to articulate the Sava countries' strategy and vision for the framework, and the focus of this strategy on the Water Framework Directive, and to show how each project fits within that strategy.

In this regard, it would be very useful to formulate an over-all basin-wide technical assistance project in order to better formulate the total range of Projects 6 – 11. This would require extensive inputs from the Sava countries, including relevant ICPDR expert groups. In these expert groups extensive knowledge is available to assist in identifying hardware, software and training needs (both technical and institutional).

3.4. Ports and Navigation Projects

1. The Sava countries need to reinvigorate the process of cooperation in executing a regional plan for reopening navigation. Overall, it appears that the level of preparation for restoration of navigation on the Sava River is not beyond the conceptual level, as defined in the existing project fiche. While individual countries, particularly Croatia, have executed portions of the project, little progress has been made at the regional level since the issuing of the Interim Action Plan in March 2003. Funding by individual countries has been very uneven, and there is not a coordinated effort among the countries to prepare the project for financing the major cost items (i.e., dredging and marking).

2. One of the most critical immediate obstacles to project execution is the need to finalize a bathymetric survey in the S-M section of the Sava. Given the depth of the channel in this section, the survey would not necessarily need to be at the same level of resolution as that already completed, and could be completed within a matter of months.

3. The current project fiche does not adequately reflect maintenance costs. Normally, maintenance of navigation conditions on free flowing rivers (without locks and dams) requires efforts and costs not much lower than initial capital work to open a navigable channel. The Sava River is not an exception. The fluctuation of high and low water flow is about 1 to 10 (3,000 and 300 cu. m. per sec at high and low water respectively). During floods existing channels can be silted, necessitating annual maintenance works. An account of maintenance is needed to present more realistic assessment of overall costs associated with restoration of navigation.

4. The Action Plan needs to provide a reasonable picture of the likely traffic to be expected on the Sava. The analysis does not need to be a formal cost benefit analysis but rather an illustration of the waterway's role in the overall regional transportation system. Several factors can be noted in support of this opinion. Restoration of navigation conditions to the 1990 level is a long-term project, providing basic infrastructure and, in addition to low cost transportation,

may stimulate the expansion of water related industries. A number of major benefits of river navigation are “external”, making them difficult to quantify. These include, for example, the reduction of congestion on land modes, better safety and environment, etc. Due to these benefits, it is a known practice in the European Union to support water transportation, inclusive of direct subsidies, such as the Marco Polo program for environmentally friendly transportation projects. Finally, and notwithstanding maintenance costs, initial investments in restoration of navigation in the Sava River is relatively low, about 20 million euro, including navigation aid but excluding de-mining and the clearing of debris.

At the same time, reference to traffic prior to 1990 is not sufficient to demonstrate the economic validity of the project. The entire regional economic and, accordingly, transportation structure has changed. Restoration of navigation conditions on the Sava River expected to be publicly financed, just like waterway projects elsewhere. Therefore, it is important to illustrate to the public and to potential sponsors the regional significance of the waterway. Much of the related information is currently available in existing reports, addressing markets for the four individual ports on the Sava River.

5. Project fiches in the IAP for the three ports reviewed during this mission (Projects 3-5) have not been updated to reflect more recent information that has been developed by port authorities and (in the case of the Brcko port) by OHR concerning costs and financing options. The project fiches should be updated to reflect this more recent information and to reference recent studies. Further, all of the port projects could greatly benefit by providing a broad picture of projected traffic and regional benefits to be realized by the projects (as discussed above).